

# Gender and ethical consumption of energy in smart homes

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## Abstract

An adaption to smart technologies in homes will inevitably produce new conditions for everyday life and thus also for relations between gender and ethical consumption. The home can be seen as a feminine domain and research shows that men tend to be more technically interested, whereas women generally tend to be more environmentally concerned and engaged in taking action according to climate changes. The smart technology agenda, which now focus on a masculine ideal consumer, might therefore benefit from a stronger inclusion of women to support a successful adaptation of smart technologies in everyday life. Acknowledging how everyday life and home are gendered and that gender roles are produced and reproduced through everyday practices, is therefore vital to ensure a successful transition into a smart home future. Otherwise, the risk is that the development will contribute to producing further gender inequalities in everyday practices.

Keywords: smart technology; gender; home; energy; ethical consumption.

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## 1. Introduction

Visions of the smart home have been formulated for decades, although consumers continue to be reluctant to buy such smart technologies, maybe because the technologies do not really solve any realized problems for them (The Economist, 2016). There are, however, reasons to believe that the slow development in adaptation of smart home technologies may change as there seems to be a combined effort from public and private actors in promoting these technologies, especially within the energy sector (Gram-Hanssen & Darby, 2016). This development is most pronounced in the global north, though also appearing more worldwide. Based on this understanding of changes in the energy sector, we will, in this article, discuss how such changes may influence and interact with consumers in their everyday life in homes, and specifically how this may interact with different gender roles from an ethical consumer point of view.

Ethical consumption includes the use of the consumer market for political or ethical purposes, where consumers use their wallet to vote for some products rather than others, or more generally for opting for different lifestyles (Micheletti, 2011). Consumer ethics, in relation to households' energy consumption, are primarily related to energy consumption as the major driver for CO<sub>2</sub> emissions and climate change, and thus for severe environmental consequences. This also includes a north-south perspective, as energy consumption is mainly high in the global north that, whereas it is generally the global south that will suffer the most from global climate change.

In the last decades of the 20th century, the relation between energy provision and energy consumption was that the provision system was developed to respond to whatever demand was coming from consumers to support a modern lifestyle. A combination of new technological possibilities, liberalisation of utilities, goals of sustainability and inclusion of more renewable energy production, is however about to change this into the so-called smart grid developments (Wissner, 2011). Still more renewables are introduced into the electricity grid, and sun and wind power plants are only producing when the sun is shining or the wind is blowing. Therefore there is a system interest in persuading consumers to consume at times when the renewables are producing, and to reduce demand at other times. The new technological possibilities of ICT give promises of an improved possibility to control a system where many small renewable production units together are matched with many small consumption units.

If these visions of a smart grid are to be unfolded and work in real life, the consumer side of the production-consumption system also has to change (Christensen *et al.*, 2013). Within the literature there are different approaches described; from active participation of the households towards much more automated approaches of how utilities can partly control households' appliances (Darby and Pisica, 2013; Friis and Haunstrup Christensen, 2016; Strengers, 2013). However, no matter how this new way of linking production and consumption is conducted, it will influence, and be influenced by, the way households unfold their everyday practices from cooking and cleaning to watching television. To say that the everyday life of households are co-constructed with the development of infrastructures and technologies is not new (Shove, 2003), as well as it is not new that the introduction of new technologies in the home relates to development of gender roles (Cowan, 1983). However, to deal with the smart developments of the near future, it is imperative to combine these perspectives. Therefore it is also relevant to ask how the smart home and smart grid development might relate to gender issues. In this vein, it is further relevant to understand how ideas of home are constructed, how they relate to gender issues and how they may change historically, together with both material infrastructures and the social organization of the everyday life.

## 2. Why is gender important in studies on smart grid and smart home?

A house is a technical part of the urban infrastructure and as such linked to technical, economic and architectural developments. A home, on the other hand, is where we live our everyday life, maintain our social relationships and produce identity (Chapman, 1999; Després, 1991; Giddens, 1990; Gullestad, 1989; Mallett, 2004; Pink, 2004). The home is, as Gullestad puts it, the center of everyday life where human beings find meaning in their existence (Gullestad, 1989).

Home research has developed rapidly within the last three to four decades with the development of cultural studies and gender studies, but also with new approaches within anthropology, sociology, psychology, human geography, and what has been named *the spatial turn* in human science (Foucault, 1986). This has contributed to new understandings of home as an anchor of material, social and cultural perspectives on everyday life and domestic practices (Douglas, 1991; Massey, 1994; Miller, 2010).

The activities, relations and identities that are produced and reproduced in the home are highly gendered. First of all, because women traditionally spend more time and resources on tasks relating to home and households, like child caring, cooking and cleaning. Since the 1990s, decreasing birthrates, increasing numbers of women in education and the labour

market, active fathers and more singles living alone have had a great influence in modern Western societies and have led to a clear reduction in gender inequality in the performance of activities in conventional households. Despite this significant change, gender is still at play: women still have the largest workload in households, which in itself opens up to questions concerning the relation between everyday practices and home attachments, decision making about the allocation and distribution of resources, and who has the authority to change households' routines, consumption and activities (Chapman, 1999; Douglas, 1991).

Secondly, home itself is socially, historically and culturally gendered (Chapman, 1999; Pink, 2004; Sullivan, 2000). This means that inequality also has to do with structural implications related to historically and culturally profound discourses of gender, and more specifically to the production of gender roles and gendered space over time (Chapman, 1999; Gilles, 1997; Gullestad, 1989). As several researchers have argued, the modern home, suburbs and everyday life, have largely been seen as feminine domains, dominated by women and loaded with female activities, while public life, the city and the capitalism have been connoted masculine (Giles, 2004; Hayden, 2002). In the 1990s and 2000s this led to a deconstruction of (an argued) canonized masculine and urban understanding of modernity (Chapman, 1999; Giles, 2004; Hayden, 2002). At the same time it opened up a more nuanced understanding of the role of the male figure in traditionally female domains like childrearing, cooking and home caring (Gilles, 1997; Hayden, 2002). However, as studies show, gender discourses are still produced and reproduced by media, myths and cultural practices in the everyday life which, again, influences the way people conceive of themselves as gendered within a household (Butler, 1990; Gilles, 1997; Hayden, 2002; Pink, 2004).

Thirdly, performative studies have led to new approaches in research, focusing on how the fluidity of gender overlaps with sensory experiences, identities and everyday practices. As Pink argues, equality in households does not reveal anything about how this equality is experienced and perceived by men and women, nor does it account for the intentionalities and agents behind them. This means that the ways men and women practice their housework and home decoration point to different modes of resistance or conformity to gender discourses (Pink, 2004). This reveals how diversity and unevenness within a household are hidden in culturally informed experiences and tactics. If we fail to acknowledge this, the policies and new technologies that are developed will not be successfully adapted into household practices, and at the same time we risk – unconsciously – to contribute to producing gender inequality.

### 3. What do we already know about smart grid and gendered consumption and prosumption?

Research on gender and energy is quite limited, however, it has been established that gender issues influence energy use and the related choices, attitudes and knowledge (Clancy and Roehr, 2003). Sovacool highlights that a majority of authors in leading energy journals are male, and further that the emerging field of gender and technology calls for an interest in the field of energy consumption and gender, to broaden the focus on technologies to also include diversity and inclusion (Sovacool, 2014).

There are several reasons for the lack of research on gender and energy, especially regarding research on gender differences in relation to household energy consumption. The most important reason is that energy (e.g. electricity and heating) is consumed by households and measured at household level. Thus, household consumption is the outcome of

the collective actions of the householders and the interaction between them. However, there are examples of studies that investigate gender differences in energy consumption. Using survey data, Abrahamse and Steg (2009) find that there are no significant differences between men and women related to direct energy use and energy savings. The study is, however, based on a low number of respondents, and the survey was conducted for only one member of the households. A potential alternative approach is to look at data on one-person households; although this group would be biased according to social characteristics, such analysis could still reveal indications of gender differences in energy consumption practices, and through that gender differences in understandings of for example notions of comfort and cleanliness.

In a quantitative study on men and women living in single-person households, in four different EU countries, Rätty and Carlsson-Kanyama (2010) found gender differences in energy use, especially when including both energy consumed directly by the household and indirectly through consumed products, which have taken energy to produce. They report that the average single man in the study had a higher consumption level than the average single woman, which can also be related to men's higher expenditure. The main differences were related to mundane activities such as transport (car use) where men had a higher consumption level, and to the general consumption of food, hygiene, household effects and health. Women used slightly more energy than men on this general household consumption, while in some countries men consumed more meat. Other studies have reported that single men and single women own different energy-consuming appliances, respectively related to communication/entertainment and household chores (Clancy and Roehr 2003).

As a consequence of the difficulties of studying gender differences in households with more than one person, most of the studies either focus on gender differences in thermal comfort preferences (Brounen *et al.*, 2013; Karjalainen, 2007), specific behaviour (Andersen *et al.*, 2009), attitudes (Yang *et al.*, 2015) or habits (Hansen *et al.*, forthcoming). Regarding comfort preferences, the results are mixed. Using survey data, Brounen *et al.* (2013) find no indications of women having a preference for higher ambient temperatures than men, whereas Karjalainen (2007) find that women prefer higher room temperatures than men, and that men tend to control thermostats more often than women. Andersen *et al.* (2009) find that gender has an effect on window opening behaviour, and in a recent study by Hansen *et al.* (forthcoming), it is shown that women tend to wear warmer clothing such as warmer socks and sweater during winter than men. A study by Carlsson-Kanyama and Lindén (2007) confirms that temperature can be a conflicting issue to be negotiated in couples. However, in surveying both men and women in a household, Yang *et al.* (2015) find that couples (roughly) share attitudes towards heating energy use with the largest difference being according to attitudes towards thermal comfort.

Other energy-consuming household practices are also gendered, and it is seen that in heterosexual households men are responsible for technical solutions related to energy supply and house maintenance, while women are responsible for energy conservation in daily household tasks (Clancy & Roehr, 2003). For example, in a study by Carlsson-Kanyama and Lindén (2007) laundry tasks were mainly undertaken by women, and therefore incentives to conserve water and electricity in this regard increased the work load on women, as laundry was dried without tumble driers and washing machines were used during the night, which resulted in clothes to be hanged early in the morning, or the washing was done during weekends, when prices were low. In terms of house refurbishments though, the male of the household was in charge (Carlsson-Kanyama and Lindén, 2007). The perspective of gender and energy refurbishments was also studied by Tjørring (2016), who found that gendered everyday practices influence male and female householders' perspectives on decisions regarding retrofitting their house (Tjørring, 2016).

Another aspect relates to differences in interest and attitudes towards, for instance, climate change, where women seem to be more worried and engaged in taking action (Carlsson-Kanyama, Ripa Juliá, and Röhr 2010), even though it was also found that economic incentives were motivational for both men and women (Carlsson-Kanyama and Lindén, 2007). That women tend to be more environmentally concerned has been called the ‘feminization of environmental responsibility’ and ‘feminization of ethical consumption’ (Dzialo, 2017). It has been shown that this feminization of environmental concern and ethical consumption varies widely cross-nationally and therefore has to be seen in light of the national context of gender equality. These analyses of gender and ethical consumption also raise the important question of how ethical environmental consumption may put an extra burden on women, who then not only has the main responsibility of many daily household chores, but also has to be responsible for the major global sustainability problems (Dzialo, 2017).

The dominating smart technology agenda within the energy field strongly calls for a focus on gender and diversity within energy consumption in households, as pointed to in the introduction of this paper. Strengers (2013) has scrutinised this dominating trend underlining how the smart agenda, in terms of the consumer, has a narrow focus on an ideal user type, by Strengers (2013) termed the ‘Resource Man’. This ideal consumer in the smart energy grid is efficient, rational and technologically enabled. According to Strengers, this is a functional and masculine way of imaging the consumer from within male-dominated industries of engineering, economics and computer science (Strengers, 2013). Similarly, such gender differences are apparent in respect of interest and knowledge about energy supply issues, where men have stronger representation within the energy sector and much higher representation in management boards of European energy companies (Carlsson-Kanyama *et al.*, 2010; Clancy and Roehr 2003). A study by Fraune (2015) in Germany explored differences in women’s and men’s involvement, investment and decision making in regards to taking part in citizen renewable electricity production schemes. The study showed that men invest more in renewable energy, which also influences voting and control rights that appear as lower for women in citizen participation schemes and furthermore women have less leadership positions within such schemes (Fraune, 2015).

In developing countries women comprise the majority of inhabitants being vulnerable to energy scarcity, for example in terms of changes to the daily housework such as fetching water or fuel (Sovacool 2014). In a historical perspective, it has been shown that electrification in developed countries increased the time women spent on housework rather than decreased it, because of social changes in expectations to cleaning and other housework tasks (Cowan, 1983). Thus energy is a highly gender-structured issue; however, gender also intersects with other socio-economic characteristics such as age and income, when investigating energy consumption. A recently published report on the UN Sustainable Development Goals (SDGs) strongly underscores the importance of addressing gender in all types and levels of energy and sustainability related questions in research and innovation, together with other central issues of the SDGs: “(...) *gender inequality issues cannot be separated from actions to tackle poverty, hunger, poor health and wellbeing, maternal death, climate change adaptation, energy and environmental burdens, economic hardships, and societal insecurity*” (Lee & Pollitzer, 2016). This implies undertaking gender-sensitive analyses of interlinkages between energy use, choices and usages of technologies, as well as the impacts of energy efficiency measures on gendered divisions of labour and gender perspectives on energy projects (Lee and Pollitzer 2016).

## 4. Conclusion

This paper started by establishing that in the future we may envision changes in the relation between users and suppliers of energy and the importance of this in relation to gender differences in everyday life. We have shown how home and everyday life are highly gendered matters, and we have introduced studies on energy consumption and gender. We have, however, also pointed out that much more research on this important topic is needed, and for several reasons this includes research interests as well as ethical considerations that combine gender equality and environmental sustainability.

Ethical consumption related to energy and smart grid, is primarily related to the sustainability issues of climate change. Being an ethical consumer, and using the power as a consumer to influence the future towards a low carbon future, includes many different types of tasks, such as taking decisions on buying a-label appliances and energy retrofitting houses, as well as changing mundane everyday practices when cooking and doing laundry. As shown in this article these different tasks are often attributed respectively men and women, therefore it is also likely that ethical consumption in relation to smart energy will take slightly different forms according to gender. Research has shown that women tend to be more environmentally concerned than men, whereas men tend to be more technically oriented and interested. As both approaches are needed for a sustainable transition, ethical consumption may thus take different relevant approaches and these are most likely to be highly gendered. Further, when promoting ethical sustainable energy consumption it is important not to put the whole ethical burden on one gender.

From a gender equality perspective it is thus essential to highlight how technical changes in energy provision may also have profound consequences for gender equality, as there are differences in what everyday practices men and women perform in the home and because there are gendered differences in how decisions are taken. From the perspective of securing a low carbon, and thus sustainable, future energy system it is imperative to include understandings of gender and ethics. On the one hand because we might otherwise see unintended side effects of the technical changes, and on the other hand because the technical system interact with everyday lives of householders; and not acknowledging the differences in gendered lifestyles may seriously hamper the extent to how successful the future smart grid solutions will be. When public policy thus seeks to promote ethical consumption by the citizens, through technology, incentives and information, it is imperative that such policy for ethical consumption includes knowledge and understandings of gender differences in ethical consumption related to energy and sustainability.

In a research perspective, we have shown how it is essential to understand the differences and interplay within gender roles, and how gender interacts with social classes (and thereby lifestyles) to understand energy consumption. Otherwise, we will lose sight of important social dynamics of change and reproduction, and thereby insights on how energy consumption practices are performed, reproduced and changed. In addition, as all people consume energy, this is also a good case to study and better understand gender differences and how gender roles are produced and reproduced through mundane practices within the home, which, due to the non-reflexive and inconspicuous character of these practices, often seem to be hidden from observers and even participants.

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## For Citation

Gram-Hanssen, K., Mechlenborg, M., Madsen, L. V. & Hansen, A. R. (2017). Gender and ethical consumption of energy in smart homes. *Journal of Consumer Ethics*. 1(2), 111-119.

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ISSN 2515-205X